IN THE CLAIMS

The status of the claims is listed below:

Claims 1-83: (Canceled).

84. (New): A process for producing an alumina coating comprised mainly of α crystal structure, comprising:

coating a base material with a metal component comprising Al and Ti and one or more of B, C, N and O to form a primary coating,

oxidizing the primary coating to form an oxide-containing layer, and

forming an alumina coating comprised mainly of α crystal structure on the oxide-containing layer.

85. (New): The process according to Claim 84, wherein the outermost surface side of the oxide-containing layer is substantially comprised of alumina.

86. (New): The process according to Claim 84, wherein the primary coating comprises TiAlN.

87. (New): The process according to Claim 84, wherein the primary coating comprises a nitride, cemented carbide, carbonitride, boride, nitroxide, or carbonitroxide comprising Al and Ti, and at least one element selected from the group consisting of elements of the groups IVa (except Ti), Va, and VIa and Si.

88. (New): The process according to Claim 84, wherein the primary coating comprises TiA1CrN.

89. (New): A process for producing an alumina coating comprised mainly of α crystal structure, comprising:

coating a base material with a metal component comprising Al and one or more of B, C, N and O to form a primary coating,

oxidizing the primary coating to form an oxide-containing layer, and

forming an alumina coating comprised mainly of α crystal structure on the oxide-containing layer.

90. (New): The process according to Claim 89, wherein the primary coating is comprised of a nitride, cemented carbide, carbonitride, boride, nitroxide, or carbonitroxide comprising Al and at least one element selected from the group consisting of elements of the groups IVa, Va, and VIa and Si.

91. (New): A process for producing an alumina coating comprised mainly of α crystal structure, comprising:

coating a base material with a metal whose standard free energy for oxidation generation is greater than that of aluminum and a compound of one or more of B, C, N, O to form a primary coating,

oxidizing the primary coating to form an oxide-containing layer, and

forming an alumina coating comprised mainly of α crystal structure on the oxide-containing layer.

92. (New): The process according to Claim 91, wherein the metal whose standard free energy for oxidation generation is greater than that of aluminum is Ti.

93. (New): The process according to Claim 91, wherein one or two or more laminate layers selected from the group consisting of TiN, TiC and TiCN are formed as the primary coating.

94. (New): The process according to Claim 91, wherein a composition gradient layer of both material constituting elements to be connected is formed in a connecting interface between the primary coating and the base material, or layers of the primary coating.

95. (New): The process according to Claim 91, wherein a titanium oxide-containing layer is formed as the oxide-containing layer and, in the following formation of alumina, an alumina coating is formed while being accompanied by reduction of the titanium oxide on the surface of the layer.

96. (New): The process according to Claim 91, wherein a TiO_2-containing layer is formed as the oxide-containing layer and, in the following formation of alumina, an alumina coating is formed while being accompanied by reduction of TiO_2 to Ti_3O_5 on the surface of the layer.

97. (New): A process for producing an alumina coating comprised mainly of α crystal structure comprising:

(1) forming at least one of the following coatings (a)-(c) on a base material:

(a) a coating comprised of a pure metal or alloy:

(b) a coating comprised mainly of a metal solid-dissolving nitrogen, oxygen, carbon or boron:

(c) a coating comprised of a metal nitride, oxide, cemented carbide or boride comprising nitrogen, oxygen, carbon or boron insufficient to a stoichiometric composition,

(2) oxidizing the surface of the coating from (1), and

(3) forming an alumina coating comprised mainly of α crystal structure on the oxidized surface from (2).

98. (New): The process according to Claim 84, wherein the oxidizing is carried out in an oxidizing gas-containing atmosphere while retaining a base material temperature at 650-800°C.

99. (New): The process according to Claim 84, wherein the forming of the alumina coating is performed by a PVD method.

100. (New): The process according to Claim 84, wherein the oxidizing the surface of the primary coating and the forming of the alumina coating are carried out within the same apparatus.

101. (New): The process according to Claim 84, wherein the coating of the base material, oxidizing the primary coating, and forming the alumina coating are successively carried out within the same apparatus.

102. (New): A process for producing an alumina coating comprised mainly of α crystal structure on a base material, comprising gas ion bombarding the surface of a base material, oxidizing the resulting surface, and then forming an alumina coating comprised mainly of α crystal structure.

103. (New): The process according to Claim 102, further comprising, prior to gas ion bombarding, forming a primary coating comprising one or more of a compound of one or more elements selected from the group consisting of elements of the groups 4a, 5a and 6a of the periodic table, Al, Si, Fe, Cu and Y and one or more elements of C, N, B and 0 and a mutual solid solution of these compounds.

104. (New): The process according to Claim 103, wherein the primary coating comprises one or more members selected from the group consisting of Ti(C,N), Cr(C,N), TiAl(C,N), CrAI(C,N) and TiAICr(C,N).

105. (New): The process according to Claim 102, wherein the base material is a steel product, a cemented carbide, a cermet, a sintered cBN or a sintered ceramic.

106. (New): The process according to Claim 102, wherein the gas ion bombarding is performed within a vacuum chamber while applying a voltage to the base material in a gas plasma.

107. (New): A process for producing an alumina coating comprised mainly of α crystal structure on a base material, comprising metal ion-bombarding the surface of a base

material, oxidizing the resulting surface, and then forming an alumina coating comprised mainly of α crystal structure.

108. (New): The process according to Claim 107, wherein the metal ion bombarding is performed by generating a metal plasma in a vacuum chamber while applying a voltage to the base material.

109. (New): The process according to Claim 107, wherein the metal ion bombarding is performed by generating a plasma of Cr or Ti from a vacuum arc evaporation source while applying a voltage to the base material in the vacuum chamber.

110. (New): The process according to Claim 107, wherein the oxidizing step is carried out in an oxidizing gas-containing atmosphere while retaining the base material temperature at 650-800°C.

111. (New): An alumina coating of α crystal structure formed on a base material by a physical vapor deposition method, wherein, when the crystal structure of the alumina coating is observed by cross-sectional transmission electron microscopy (magnification: 20000 times), at least a coating growth start part is formed of alumina crystals of minute structure having crystal grains of 0.3 μm or less within the range from the initial stage of growth to 0.5 μm in the thickness direction, and crystal structures other than α crystal structure are not substantially observed in the minute crystal area.

112. (New): The alumina coating according to Claim 111, wherein crystal structures other than α-type crystal structure are not substantially observed all over the alumina coating.

113. (New): The alumina coating according to Claim 111, wherein alumina of α-type crystal structure grows in a columnar shape on the surface side of the coating.

114. (New): The alumina coating according to 111, wherein the film thickness of the alumina coating is 0.5-20 μm.

115. (New): The process according to Claim 89, wherein the oxidizing is carried out in an oxidizing gas-containing atmosphere while retaining a base material temperature at 650-800°C.

116. (New): The process according to Claim 89, wherein forming the alumina coating is performed by a PVD method.

117. (New): The process according to Claim 89, wherein oxidizing the primary coating and forming the alumina coating are carried out within the same apparatus.

118. (New): The process according to Claim 89, wherein the process of forming the primary coating, the process of oxidizing the surface of the primary coating, and the process of forming the alumina coating comprised mainly of α-type crystal structure are successively carried out within the same apparatus.

119. (New): The process according to Claim 91, wherein the oxidizing is carried out in an oxidizing gas-containing atmosphere while retaining a base material temperature at 650-800°C.

120. (New): The process according to Claim 91, wherein forming the alumina coating is performed by a PVD method.

121. (New): The process according to Claim 91, wherein oxidizing the primary coating and forming the alumina coating are carried out within the same apparatus.

122. (New): The process according to Claim 91, wherein forming the primary coating, oxidizing the primary coating, and forming the alumina coating are successively carried out within the same apparatus.

123. (New): The process according to Claim 97, wherein the oxidizing is carried out in an oxidizing gas-containing atmosphere while retaining a base material temperature at 650-800°C.

124. (New): The process according to Claim 97, wherein forming the alumina coating is performed by a PVD method.

125. (New): The process according to Claim 97, wherein oxidizing the primary coating and forming the alumina coating are carried out within the same apparatus.

126. (New): The process according to Claim 97, wherein forming the primary coating, oxidizing the primary coating, and forming the alumina coating are successively carried out within the same apparatus.